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TRANSLATION

French Patent Application **82 21757**
Publication number: **2 538 238**
Filing date: **December 24, 1982**
Applicant: [the company] **SCERAB** (Société Civile d'Etudes et de Recherches
Alain BOURDIER), France
Inventor: **Alain Bourdier**
Agent: **Armand Kohn**
Date of laying open the application for public inspection: BOPI "Patents"
No. 26 of June 29, 1984.
Title: **Napkins for Dry Wiping and Process of Their Manufacture.**

The present invention relates to a new type of napkin or other sheet used for cleaning objects or parts of the body. It [the invention] likewise relates to a process of producing these napkins.

Among the many articles for upkeep there are napkins or sheets, generally made of paper, type blotting-paper, impregnated with a liquid and enclosed in sealed sachets [small bags]; at the time of their utilisation, the sachet is torn open and the moist sheet serves for cleaning or the desired washing, particularly washing the hands. The principle of this article resides in the impregnation of the paper with a solution, usually alcoholic, for example, eau de Cologne, containing a bit of detergent. These napkins are very useful, above all for travel or in the course of a meal where they advantageously replace the traditional finger-bowls with lemon water. But an important inconvenience speaks against the use of these napkins: though the sachet containing the napkin is, in principle, impermeable, it is often observed that, when the sachet is opened, the sheet is no longer moist because the liquid has evaporated and the napkin is no longer effective.

The present invention provides a noticeable improvement in the above-indicated field. It [the invention] facilitates the manufacture of napkins, sheets, tampons, sponges, cotton wads, etc. of the aforementioned type for wiping, but acting in dry form, without any volatile liquid; the novel napkins, according to the invention, not only do they not lose their effectiveness in the course of time as a consequence of some evaporation of the liquid but they can be kept in unsealed sachets. Since these napkins act in the dry state and clean various surfaces as effectively as the moist napkins, they can be used for some time after having been taken from the sachet and not for a rather short time only as is the case with the known napkins and finger bowls. Furthermore, application in the dry state is often very pleasant, because this avoids for sensitive persons the feeling of moisture, which is not always pleasant. This feature facilitates the use of the napkins according to the invention for various applications in which moist napkins are unsuitable; they can

also serve for rapid dry-state disinfecting of surfaces such as surfaces on telephones, toilet seats, tables, vehicle steering wheels, arm rests, etc.

The invention results from the unexpected finding that a highly efficient cleaning effect can be obtained by means of a porous material which has absorbed a fatty substance and/or a polyol together with a surface-active compound, with the whole remaining dry and without exudation of some liquid. As a consequence of this novel fact, the invention makes it possible, - in its various embodiments - to obtain dry sheets or napkins for wiping with the above-indicated advantages.

The sheet or napkin according to the invention is characterised, first of all, in that it consists of a porous material, for example cellulose or some other material, on which one or more fatty compounds and/or polyols were absorbed together with one or more surfactants, in proportions such that there is no excess of any of the components on the surface of the porous material.

A great variety of substrates can be used for practising the invention; the industrially most readily available materials are cellulose materials or synthetic materials, i.e., papers, natural or elastomeric tissues or sponges. This substrate can have greatly dissimilar physical forms, particularly the form of foils, filaments, fluff, pads, etc., though, for the sake of simplicity of the expression, the present description refers to napkins or sheets.

The fatty compound and/or the polyol absorbed by the pores of the substrate can be either solid or liquid, but is preferably liquid at normal temperatures; but since its fraction does not exceed the absorbing power of the substrate, touching the same does not cause the feeling of moisture. The fatty compound may be a fatty acid, saturated or unsaturated, for example, oleic acid, linoleic acid, caproic acid or an other liquid acid or also an acid which is solid at normal temperature, but mixed with others and with a hydrocarbon compound in order to render a liquid mixture capable of penetrating into the pores of the substrate. The fatty compounds can be advantageously formed by one or more fatty acid esters, namely a vegetable or animal oil, or alkyl esters, particularly alkyls with C_1 to C_{12} . One can also use substances such as palm oil, olive oil, coconut oil, corn oil, etc. and/or esters such as, for example, hexyl laurate, isopropyl myristate, butyl palmitate, ethyl or octyl stearate, methyl arachidate, propyl oleate or methylglycol oleate. The fatty compound can be replaced or, preferably, be accompanied, by one or more hydrocarbons of low vapour tension, decane, dodecane, or a petroleum jelly.

The fatty compound has the task of dissolving the liposoluble substances which are present on the surface to be cleaned.

The second indispensable component in the napkins according to the invention is a surfactant compound a small quantity of which makes it possible that the napkin can remove

watery parts from the surface to be treated. The surfactant best compatible with the fatty material used is selected. In general, the three types of surfactants are suitable, namely the ionic, the cationic, and the anionic surfactants. One can also use the various alkylphenoxy polyoxyethylenes, as, for example, nonyl or octyl phenoxy-polyethoxy-ethanol, polyoxyethylene stearate or laurate, sorbitan mono-oleate (SPAN 80) or the addition product of polyoxyethylene and sorbitan mono-oleate; N-acyl sarcosinates or sodium morpholinates, sodium alkylsulfonate, sodium alkylaryl sulfonate, polyethers of alkylaryl alcohols, for example, alkyl benzene sulfonates in which the alkyl ranges from C_{12} to C_{18} , sodium salts of monoglycerids of sulfonated fatty acids, quaternary ammonium chlorides or bromides containing a C_{12} to C_{18} alkyl, for example lauryldimethyl benzylammonium bromide, etc.

In the case of napkins for cleaning parts of the human body, the surfactants are of course chosen from substances which have no detrimental effect on the skin.

According to a preferred feature of the invention, it is advisable to use, in addition to the above-indicated components, also a compound capable of inhibiting the exudation or flow of the fatty substances employed. Among the substances with the characteristic of having such an effect on fatty substances absorbed by the substrate there are particularly the higher alcohols, mainly those of C_6 to C_{18} , derivatives of abietic acids and solid triglycerids of fatty acids. Substances with a melting point above 40°C or even 60°C are of interest. The fatty substance or substances can also be fixed in the pores of the substrate by addition of an alcohol such as octanol, decanol, dodecanol, tetradecanol or hexadecanol (cetyl alcohol or cetin), ethyl or benzyl abietate, beeswax, stearin, etc.

A polyol, specifically diol or triol, is an other very useful component in a preferred embodiment of the invention. In particular, glycols have the advantage of ensuring binding between the lipophilic or hydrophilic phase of the substances present. On the other hand, they serve to dissolve pesticide compounds, specifically insecticides, bactericides and/or fungicides generally incorporated in the napkins according to the invention. In accordance with a particular feature, the napkin contains a diol or a triol, preferably with C_2 or C_3 to C_{12} . In practice, glycols or polyglycols are convenient, for example ethylene glycol, propylene glycol, butylene glycol, hexylene glycol or similar glycols, polyethylene glycols of various molecular weights, polyethylene glycol p-iso-octylphenyl ether, etc.

As mentioned above, it is in general advisable to introduce one or more pesticide substances in the fatty component and the other components of the novel wiping napkin. It can be likewise useful to employ an insecticide and/or an insect repellent. Among the various bactericides, fungicides and insecticides which can be used, the following products can be cited as

non-limiting examples: dithiocarbamates, benzyl-2-chloro-4 phenol, benzyl-2 or 4 phenol, esters of fatty phenoxylic acids, p-chloro-m-cresol or its sodium salt, hexamine salts, phenyl-2-phenol, quaternary ammonium compounds such as, for example, benzyl-dimethyl-alkyl ammonium chloride or bromide; dichloro-2-3-naphtoquinone 1-4, dithia-1-4-anthraquinone of carbonitrile 2-3, dodecyl guanidine acetate, merthiolates, dimethyl phtalate, terpenes, etc.

The presence of bactericides allows the utilisation of the novel napkins for rapid, dry disinfection of various surfaces such as surfaces of wood, plastics, fabric, of a wall or other surfaces.

Since the amount of the fatty substances retained by the substrate depends upon the physico-chemical properties of the same, i.e., upon its absorbent capability, the fraction of the fatty substances in the napkins of the invention can vary widely; for example, they can amount to 1 to 20% by weight of the napkin and, more often, to 1 to 10%, without these values setting limits.

As to the surfactants, their concentrations in a wettable medium are usually low, most often of the order of 0.01 to 1% by weight. This is also the case in the napkins according to the invention, but with certain surfactants it may be advantageous to increase their concentration up to about 5% or more of the total weight of the impregnated napkin.

The concentration of compounds with a melting point preferably above 60 °C, which are added to fix the fatty compound in the substrate, particularly the higher alcohol, beeswax or stearin, is of the same order of magnitude as that of the fatty compound in the napkin.

As to the polyols and, more particularly, the glycols to be added to the composition, in general they must be present in a concentration which is relatively high in relation to the fatty compound; their concentration in the final product is preferably from 1 to 3 times the weight of the fatty compound. It is well known that pesticides are used in practice in low concentrations which, inter alia, depend upon their efficiency as bactericides, fungicides, etc.

The addition of perfumes is sometimes indicated.

The invention comprises also the process of producing the foils or napkins impregnated with the above-described compounds. This process consists of passing a band of fabric, paper or some other porous substrate through a solution of fatty compounds and surfactants and, possibly, other components according to the invention; the solution was prepared with a volatile solvent which can be easily removed, preferably a solvent with a boiling point from 40 °C to 100 °C. After this passage, which lasts long enough for the substrate to be practically saturated with the solution, the band is dried until the solvent has been completely removed. Drying can be carried out in a well-known fashion with infrared, in an air current.

Of course, in an industrial arrangement the solvent vapours are collected for recovering the solvent. The various well-known solvents can be used with the condition that they facilitate dissolving at least part of the constituents and the dispersion of constituents which are not soluble. The solvent may be water or a mixture of water and alcohol, with the compounds according to the invention being emulsified because of the presence of the surfactant.

The invention is explained by the following non-limiting examples.

Example 1

There is prepared a mixture of a liquid fatty compound, isopropyl myristate with sodium lauryl sulfate as surfactant; cetyl alcohol is added as a higher alcohol and hexylene glycol is added as glycol; the two compounds indicated below are the pesticides.

The composition, expressed in grams, of the liquid mixture is as follows:

isopropyl myristate	20
sodium lauryl sulfate	13
cetyl alcohol	12
hexylene glycol	48.75
phenyl-2-phenol	2.50
benzyl-2-chloro-4 phenol	<u>1.75</u>
	100.00

This mixture is diluted with 1 kg of methylene chloride. Following the above-described procedure, absorbing paper bands for napkins are impregnated with the solution obtained in this way.

After impregnation, dewatering and drying, the paper band is cut into napkins of the desired size, which are then placed in boxes or closed sachets. The napkins retain 37.4 % by weight of a mixture the composition of which is indicated below, with the methylene chloride having been completely eliminated.

As a result, the various constituents are present in the napkin in proportions of

isopropyl myristate	7.5 %
sodium lauryl sulfate	4.9
cetyl alcohol	4.5
hexylene glycol	18.3
bactericides	2.35

Example 2

A preparation similar to that of Example 1 is obtained with the mixture:

octyl stearate	24 g
polyethoxylated nonylphenol with	
11 CH ₂ O groups	9
octyl alcohol	7
propylene glycol	59.7
dimethylbenzylammonium lauryl bromide	<u>0.3</u>
	100.00

Example 3

A preparation similar to that of the preceding examples is obtained with the following fatty substances:

methyl-glycol oleate	34 g	
polyethoxylated lauryl alcohol	6	
ethyl abietate	12	
butylene glycol		47.8
hexamidin isothionate	<u>0.2</u>	
	100.00	

Example 4

The composition contains the following substances (in g):

paraffin oil	38	
sodium toluene sulfonate	11	
hexyl alcohol	9	
butylene glycol	41	
p-hydroxy ethylbenzoate	0.4	
linalol	<u>0.6</u>	
	100.00	

Example 5

The composition for impregnating disinfecting napkins contains (in g):

ethyl laurate	24 g	
sodium lauryl sulfate	14	
cetyl alcohol	12	
ethyldiethylene glycol	50	
benzalkonium	<u>2</u>	
	100.00	

As in Example 1, methylene chloride is used to impregnate the paper bands which are finally cut into rectangular 10 x 15 cm sheets, folded, and sealed in impermeable sachets.

Cultures of the following bacteria were prepared in known fashion in agar-agar for testing the effectiveness of the napkin:

Pseudomonas aeruginosa,
Escherichia coli,
Staphylococcus aureus,
Streptococcus faecalis, and
Salmonella typhi murium.

Each of these cultures was diluted with distilled water to obtain a concentration of about 10^5 bacteria/ml; 50 ml of the liquid were sprayed onto rigid 250 x 250 x 10 mm plates of plastic material and allowed to dry.

After that, these plates were immediately wiped dry with the napkins made in the above-indicated manner.

For each species of bacteria, two plates are treated, one for 30 seconds, the other one for 60 seconds in contact with the napkin. After wiping, each plate is done with 50 ml distilled water and the number of germs in the water recovered is counted.

The results are hardly different for the five cultures. There are found in the water:

after 30 seconds wiping: about 100 germs/ml

after 60 seconds wiping: about 0 germs/ml

The napkins are therefore convenient for rapid disinfection of telephone handsets, lavatory seats or other objects with microbial proliferation.

CLAIMS

1. Napkin, sheets or fibres for cleaning in the dry state, consisting of a substrate impregnated with a surfactant, characterised in that the substrate contains a fatty material and/or a polyol which may be liquid at normal temperature, but is used in an amount such that the substrate remains dry.
2. Article according to Claim 1, characterised in that the fatty material is a saturated or unsaturated acid, a fatty acid ester and/or a hydrocarbon with low vapour pressure.
3. Article according to Claim 1 or 2, characterised in that the fatty material is formed by one or more compounds of the type of oleic, linoleic, caproic acid, esters of fatty acids with C₁ to C₁₂ alkyls, and aliphatic hydrocarbons with C₁₀ and more.
4. Article according to one of Claims 1 to 3, characterised in that the fatty compound is present in amounts of 1 to 20 % by weight of the napkin.
5. Article according to one of the preceding claims, wherein the surfactant is anionic, cationic or non-ionic, characterised in that the content of this compound is between 0.01 and 5 % by weight.
6. Article according to one of the preceding claims, characterised in that it comprises a compound capable of impeding the exudation of the fatty material, with the compound being preferably a higher alcohol, a derivative of abietic acid or a solid triglycerid.
7. Article according to Claim 6, characterised in that the said compound has a melting point above 40 °C.
8. Article according to Claim 6, characterised in that the said compound is cetyl alcohol, cetin, ethyl abietate, beeswax or stearin.
9. Article according to one of the preceding claims, characterised in that it contains also a polyol, particularly a diol or triol, specifically a C₂ to C₆ alkylene glycol.
10. Article according to Claim 9, characterised in that it contains an amount of polyol equal to about 1 to 3 times the weight of the fatty material.
11. Article according to one of the preceding claims, characterised in that it contains a pesticide, specifically a bactericide, a bacteriost, a fungicide, a fungistat, an insecticide and/or an insect repellent.
12. Process for producing an article according to one of Claims 1 to 11, which consists of impregnating the substrate with a solution of the ingredients to be absorbed, characterised in that the solution is prepared by dissolving these ingredients in an organic solvent which is thereafter completely evaporated.

13. Process for producing an article according to Claims 1 to 11, which consists of impregnating a substrate with an aqueous emulsion of the ingredients to be absorbed, wherein the article is subsequently dried in a way such that the water of the emulsion is completely removed.